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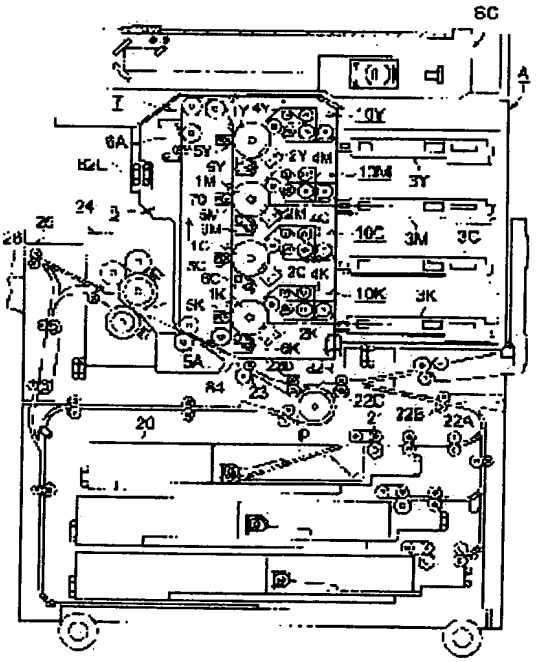
(54) COLOR IMAGE FORMING DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a color image forming device to/from which a processing frame consisting of plural photoreceptors, intermediate transfer units and developing means or the like can be attached/detached and which is excellent in the attachability/detachability and maintainability of the developing means in a state where the processing frame is drawn out.
SOLUTION: This color image forming device is provided with the processing frame 8 where at least plural image carriers 1Y, 1M, 1C and 1K and plural developing means 4Y, 4M, 4C and 4K are attachably/detachably disposed and integrated, and supporting rails 82L and 82R supporting and sliding the frame 8 so that the frame 8 can be drawn out to the outside of a device main body A. The rails 82L and 82R support the frame 8 at a position where they do not hinder the attachability/detachability of the means 4Y, 4M, 4C and 4K.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] Two or more development means to develop at least the electrostatic latent image formed on two or more image support and said image support with a toner, The process stand which was color picture formation equipment which ****, arranged two or more of said image support and said two or more development means removable at least, and was unified, It is color picture formation equipment which has the support rail slid withdrawal out of equipment in support of said process stand, and is characterized by said support rail supporting said process stand in the location which does not carry out trouble of the attachment-and-detachment actuation of said development means.
[Claim 2] Said color picture formation equipment is color picture formation equipment according to claim 1 which has the middle imprint object which imprints serially the toner image formed on said image support, and supports the color toner image of superposition, and is characterized by said middle imprint object being arranged by said process stand removable.
[Claim 3] Said color picture formation equipment is color picture formation equipment according to claim 1 which has a conveyance means to support a record medium and to make the toner image on said two or more image support imprint on said record medium serially, and is characterized by said conveyance means being arranged by said process stand removable.
[Claim 4] Said process stand is color picture formation equipment given in any 1 term of claims 1-3 characterized by the withdrawal thing at an equipment near side.
[Claim 5] Said two or more image support and said two or more development means are color picture formation equipment given in any 1 term of claims 1-4 characterized by being arranged by the abbreviation perpendicular.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the color picture formation equipment of the tandem die which imprints the toner image formed on two or more image support to a middle imprint object or a record medium especially about the image formation equipment which used electrophotography methods, such as a copying machine, a printer, and facsimile, with two or more image support, latent-image means forming, and a development means.
[0002]
[Description of the Prior Art] In the color picture formation equipment using the conventional electrophotography method, the various proposals of the method which carries out the parallel arrangement of two or more image formation sections in the conveyance direction, and carries out the sequential imprint of the toner image of a different color formed on the photo conductor drum (image support) of image formation circles, respectively on the record medium held on the conveyance belt are made.
[0003] Moreover, the color picture formation equipment using the imprint drum which twists the record medium with which it was fed from the feed section instead of said conveyance belt is also known. A full color image is formed in said record medium by carrying out the sequential imprint of the toner image formed into the visible image with the development means by the record medium twisted around this imprint drum. Then, after dissociating from an imprint drum and establishing a record medium in a toner image with a fixing means, it is discharged.
[0004] Furthermore, in other color picture formation equipments, after carrying out the parallel arrangement of two or more image formation sections in the conveyance direction, carrying out the sequential imprint of the toner image of a different color formed in photo conductor drum lifting of image formation circles, respectively on a middle imprint object and carrying out superposition formation of the primary imprint image, the method which imprints said primary imprint image secondarily on the record medium held on the conveyance belt is also proposed.
[0005] Since the color picture formation equipment of the tandem die which has such two or more photo conductors forms a color picture by one revolution of two or more photo conductors, it can output a full color image to a high speed compared with the color picture formation equipment of the many rotary systems which are made to carry out multiple-times rotation of the single photo conductor, and form a color picture.
[0006]
[Problem(s) to be Solved by the Invention] Two or more photo conductors and two or more development means need to remove from the body of equipment for a maintenance or a life. Then, the color picture formation equipment of this tandem die was asked for the structure of being easy to remove two or more photo conductors and two or more development means.
[0007] That is, it is required to make it the structure where a user tends to work because of maintenances, such as two or more photo conductors.
[0008] Then, two or more photo conductor and two or more development means are arranged at least to a stand, and it enables it to pull out two or more photo conductors etc. to the body of equipment in one. If it does in this way, since maintenance and attachment-and-detachment actuation can be performed in the location which pulled out the process stand containing a photo conductor, operability will improve. Moreover, since a process stand can draw out two or more photo conductor and two or more development means in one, the maintenance to two or more photo conductors etc. can be performed at once, and operability improves further.

[0009] Such a process stand has remarkable mass and the support rail which supports a process stand must secure the mass balance of the body of equipment also in the condition of having pulled out the stand.
[0010] However, trouble may be caused to attachment-and-detachment actuation of a development means depending on the arrangement part of a support rail.
[0011] It is made in order that this invention may solve an above-mentioned trouble, and the purpose of this invention makes removable the process stand which consists of two or more photo conductors and two or more development means, and aims at offering the color picture formation equipment in which the attachment-and-detachment operability of a development means and maintenance nature were excellent where a process stand is pulled out.
[0012]
[Means for Solving the Problem] The color picture formation equipment of this invention which attains the above-mentioned purpose Two or more development means to develop at least the electrostatic latent image formed on two or more image support and said image support with a toner, The process stand which was color picture formation equipment which ****, arranged two or more of said image support and said two or more development means removable at least, and was unified, It has the support rail slid withdrawal out of equipment in support of said process stand, and is characterized by said support rail supporting said process stand in the location which does not carry out trouble of the attachment-and-detachment actuation of said development means.
[0013]
[Embodiment of the Invention] Drawing 1 is the cross-section block diagram of the color picture formation equipment in which the gestalt of 1 operation of this invention is shown.
[0014] This color picture formation equipment is called tandem-die color picture formation equipment, and consists of two or more sets of image formation sections 10Y, 10M, 10C, and 10K, the middle imprint unit 7, and a feed conveyance means and the fixing means 24. Manuscript image reader SC is arranged in the upper part of the body A of image formation equipment (the body of equipment is called hereafter).
[0015] Image formation section 10Y which forms the image of a yellow color has electrification means 2Y arranged around image support (photo conductor) 1Y, exposure means 3Y, development means 4Y, primary imprint means 5Y, and cleaning means 6Y. Image formation section 10M which form the image of a Magenta color have image support (photo conductor) 1M, electrification means 2M, exposure means 3M, development means 4M, primary imprint means 5M, and cleaning means 6M. Image formation section 10C which forms the image of a cyanogen color has image support (photo conductor) 1C, electrification means 2C, exposure means 3C, development means 4C, primary imprint means 5C, and cleaning means 6C. Image formation section 10K which form a black image have image support (photo conductor) 1K, electrification means 2K, exposure means 3K, development means 4K, primary imprint means 5K, and cleaning means 6K.
[0016] The middle imprint unit 7 is wound with two or more rollers, and has the middle imprint object 70 of the shape of a semi-conductive endless belt supported rotatable.
[0017] The image of each color formed from the image formation sections 10Y, 10M, 10C, and 10K is serially imprinted on primary imprint means 5Y and the 5 middle imprint object 70 which rotates by M, 5C, and 5K, and the compounded color picture is formed. Paper is fed to the record medium (a form is called hereafter) P held in the sheet paper cassette 20 by the feed means 21, it is conveyed by secondary imprint means 5A through two or more Laura Nakama 22A, 22B, 22C, and 22D and the resist roller 23, and the package imprint of the color picture is carried out on Form P. Fixing processing is carried out by the fixing means 24, and the form P with which the color picture was imprinted is pinched by the delivery roller 25, and is laid on the paper output tray 26 outside the plane.
[0018] On the other hand, as for the middle imprint object 70 which carried out curvature separation of the form P, a residual toner is removed by cleaning means 6A after imprinting a color picture in Form P by secondary imprint means 5A.
[0019] The pressure welding of primary imprint means 5K is always carried out to photo conductor 1K during image formation processing. The pressure welding of other primary imprint means 5Y, 5M, and 5C is carried out to the photo conductors 1Y, 1M, and 1C only corresponding to the time of color picture formation, respectively.
[0020] Only when Form P passes through this and a secondary imprint is performed, the pressure welding of the secondary imprint means 5A is carried out to the middle imprint object 70.
[0021] Drawing 2 is the perspective view showing the condition of having pulled out the process stand 8 from the body A of equipment. Drawing 3 is the sectional view of the process stand 8, and drawing 4 is the

perspective view of the process stand 8.
[0022] The process stand 8 consists of the image formation sections 10Y, 10M, 10C, and 10K and the middle imprint unit 7.
[0023] Column arrangement of the image formation sections 10Y, 10M, 10C, and 10K is carried out perpendicularly. The middle imprint unit 7 is arranged at the method of illustration left-hand side of photo conductors 1Y, 1M, 1C, and 1K. The middle imprint unit 7 winds rollers 71, 72, 73, and 74, and consists of the rotatable endless-belt-like middle imprint object 70, the primary imprint means 5Y, 5M, 5C, and 5K, and cleaning means 6A.
[0024] The process stand 8 is withdrawal from the body A of equipment. That is, the front door 101 of the body A of equipment is opened wide, the process stand 8 is grasped, and it pulls out to a near side. The process stand 8 is guided with the support rails 82L and 82R on either side, slides, and is pulled out ahead. The image formation sections 10Y, 10M, 10C, and 10K and the middle imprint unit 7 are united, and are pulled out from the body A of equipment by drawer actuation of the process stand 8.
[0025] Support rail 82L on the left-hand side of [illustration] the process stand 8 is the left of the middle imprint object 70, and is arranged at the headroom section of the fixing means 24. Support rail 82R on the right-hand side of [illustration] the process stand 8 is arranged near [lowermost lower part] development means 4K. Support rail 82R is arranged in the location which does not cause trouble to the actuation which detaches and attaches the development means 4Y, 4M, 4C, and 4K to the process stand 8.
[0026] The method of the illustration right of the photo conductors 1Y, 1M, 1C, and 1K of the process stand 8 is surrounded by the development means 4Y, 4M, 4C, and 4K, an illustration lower part is surrounded by the electrification means 2Y, 2M, 2C, and 2K and the cleaning means 6Y, 6M, and 6C, and 6K grade, and the illustration left is surrounded with the middle imprint object 70.
[0027] The space section of the upper part of photo conductor 1Y is covered by the top plate (upper electric shielding member) 83 fixed to the case (frame) 81 of the process stand 8. The bottom plate (bottom electric shielding member) 84 fixed to the case 81 of the process stand 8 serves as the upper guide plate of a form conveyance way while protecting the middle imprint object 70 at the time of attachment and detachment.
[0028] The perspective view of the middle imprint unit 7 and drawing 7 of the decomposition sectional view and drawing 6 which show the condition that drawing 5 removed the middle imprint unit 7 and the development means 4Y, 4M, 4C, and 4K from the process stand 8 are the perspective views of a case 81. In addition, in drawing 6 , the left half of the middle imprint object 70 was removed on account of explanation, and the interior of the middle imprint unit 7 was made legible.
[0029] Where the process stand 8 is pulled out from the body A of equipment, after moving the middle imprint unit 7 to an illustration left a little, the middle imprint unit 7 is grasped and it pulls up to the perpendicular upper part. The gage pin 75 implanted in the both-sides side upper part of the middle imprint unit 7 is moved to the perpendicular upper part along the perpendicular slot 86, after being moved to an illustration left along the water flat groove 85 drilled by the process stand 8.
[0030] At the time of raising of the middle imprint unit 7, since a gage pin 75 is regulated by the water flat groove 85 and the perpendicular slot 86 and moves, in the member of the process stand 8, the middle imprint object 70 contacts the middle imprint unit 7, and does not damage it.
[0031] Column arrangement of the primary imprint means (it is also hereafter called a primary imprint roller) 5Y, 5M, 5C, and 5K supported horizontally and the pressurization rollers 76Y, 76M, 76C, and 76K is carried out at the inside side of the middle imprint object 70. Primary imprint roller 5Y, lever 77Y which supports pressurization roller 76Y, primary imprint roller 5M and lever 77M which support pressurization roller 76M, and primary imprint roller 5C and lever 77C which supports pressurization roller 76C are rocked by coincidence with the regulation plate 78, and presses and cancels the middle imprint object 70.
[0032] Drawing 8 is the perspective view of 4 sets of photo conductor units 11Y, 11M, 11C, and 11K.
[0033] After removing the middle imprint unit 7 from the process stand 8, the ejection of 4 sets of photo conductor units 11Y, 11M, 11C, and 11K becomes possible. Photo conductor unit 11Y of the maximum upper case consists of photo conductor 1Y, electrification means 2Y, and cleaning means 6Y. Photo conductor unit 11M of the 2nd step consist of photo conductor 1M, electrification means 2M, and cleaning means 6M. Photo conductor unit 11C of the 3rd step consists of photo conductor 1C, electrification means 2C, and cleaning means 6C. Photo conductor unit 11K of the bottom consist of photo conductor 1K, electrification means 2K, and cleaning means 6K.
[0034] If the process stand 8 is pulled out from the body A of equipment, from the reference axis of each photo conductor by which cantilever fixed support was carried out inside body of equipment A and which is not illustrated, each main hole of photo conductors 1Y, 1M, 1C, and 1K will break away, it will become

movable, and the photo conductor units 11Y, 11M, 11C, and 11K will be laid, respectively on the susceptors 87Y, 87M, and 87C of the process stand 8, and 87K.
[0035] Photo conductor unit 11Y can be slid on susceptor 87Y in this condition, and it can be made to be able to move in the direction of a void arrow head shown in drawing 5 , and can take out from the space section after removing the middle imprint unit 7. Each susceptors 87M and 87C and the ejection from 87K are possible also for the photo conductor units 11M, 11C, and 11K similarly.
[0036] Ejection is possible for development means 4K which counter development means 4M which counter development means 4Y which counters photo conductor 1Y, and photo conductor 1M, development means 4C which counters photo conductor 1C, and photo conductor 1K in the direction of a void arrow head of the method of the right shown in drawing 5 from the predetermined stowage of the process stand 8, respectively.
[0037] the support rails 82L and 82R are resembled, it meets, the process stand 8 is slid, it equips into the body A of equipment, a predetermined location is stopped, and it fixes by the locking lever which is not illustrated. A stand actuation detection means is detected by the sensor which detects that the predetermined location of the body A of equipment was equipped with the process stand 8. Or a stand actuation detection means detects that said locking lever ended predetermined actuation.
[0038] In addition, although the gestalt of the above operation explained the middle imprint object 70 of the shape of an endless belt without a joint, this invention is not limited to this and can be applied also to the middle imprint object of the shape of an endless belt with a joint.
[0039] Drawing 9 is the cross-section block diagram of the color picture formation equipment in which the gestalt of other operations of this invention is shown. Drawing 10 is the sectional view of an image formation process stand. In addition, the same sign is given to the part which has the same function as drawing 1 about the sign currently used for the drawing. Moreover, a different point from the gestalt of the aforementioned operation is explained.
[0040] The process stand 8 Two or more photo conductors 1Y, 1M, 1C, and 1K, the electrification means 2Y, 2M, 2C, and 2K, It consists of the image formation sections 10Y, 10M, 10C, and 10K which consist of the development means 4Y, 4M, 4C, and 4K, the cleaning means 6Y, 6M, 6C, and 6K, and the imprint means 50Y, 50M, 50C, and 50K, and conveyance belt 27 grade.
[0041] The conveyance belt 27 is wound around two or more rollers, and is supported rotatable. By the inside of the conveyance belt 27, the imprint means 50Y, 50M, 50C, and 50K are arranged in each opposite location of each photo conductors 1Y, 1M, 1C, and 1K.
[0042] The image of each color is formed on photo conductors 1Y, 1M, and 1C and 1K of the image formation sections 10Y, 10M, 10C, and 10K. The form P with which it is fed from a sheet paper cassette 20 is conveyed with the conveyance belt 27, and a color picture is serially imprinted on Form P by the imprint means 50Y, 50M, 50C, and 50K. Fixing processing is carried out by the fixing means 24, and the form P with which the color picture was imprinted is pinched by the delivery roller 25, and is laid on a paper output tray 26.
[0043] The perimeter of each photo conductors 1Y, 1M, 1C, and 1K is surrounded by the electrification means 2Y, 2M, 2C, and 2K, the development means 4Y, 4M, 4C, and 4K, the RININGU means 6Y, 6M, 6C, and 6K, and conveyance belt 27 grade.
[0044] The up space of photo conductor 1K of the maximum upper case is covered by the top plate 83 fixed to the case 81 of the process stand 8. The bottom plate 84 fixed to the case 81 of the process stand 8 serves as the guide plate of a form conveyance way while protecting photo conductor 1Y of the bottom at the time of attachment and detachment.
[0045] The body A of equipment is equipped with the process stand 8 removable. That is, the front door 101 (refer to drawing 2) of the body A of equipment is opened wide, the process stand 8 is grasped, and it pulls out to a near side. The process stand 8 is guided with the support rails 82L and 82R on either side, slides, and is pulled out ahead. The image formation sections 10Y, 10M, 10C, and 10K and the conveyance belt 27 are united, and are pulled out from the body A of equipment by drawer actuation of the process stand 8.
[0046] Maintenance of the image formation sections 10Y, 10M, 10C, and 10K containing photo conductors 1Y, 1M, 1C, and 1K, exchange actuation, processing of about 27 conveyance belt poor form conveyance, etc. are carried out by drawer actuation of the process stand 8.
[0047] In addition, as exposure means 3Y, 3M, 3C, and 3K, a light emitting device (LED) array may be used for the color picture formation equipment of this invention, and it may arrange it in the predetermined location in the process stand 8.
[0048] Moreover, this invention is not limited to the gestalt of the above-mentioned operation, and can be

applied to other color picture formation equipments equipped with image support (an electrostatic recording object is included), a middle imprint object, and two or more development means (a wet-developing means, an ionic current control system, etc. are included).

[0049]

[Effect of the Invention] With the color picture formation equipment of this invention, two or more image support and two or more development means have been arranged to the process stand, and where this process stand is pulled out from the operator near side of the body of equipment, operability and maintenance nature improved by making possible ejection of two or more development means. Moreover, the attachment-and-detachment nature of a development means improved by taking into consideration arrangement of the support rail which supports a process stand.

[Translation done.]

* NOTICES *

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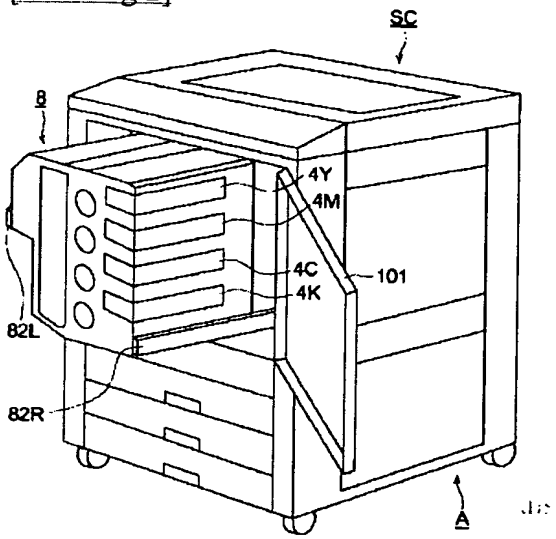
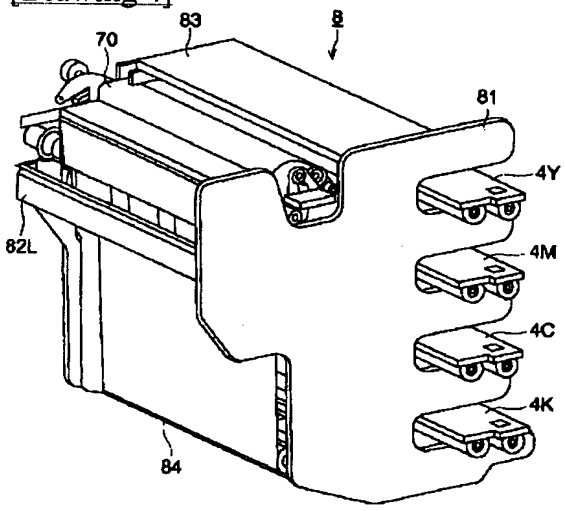
DRAWINGS

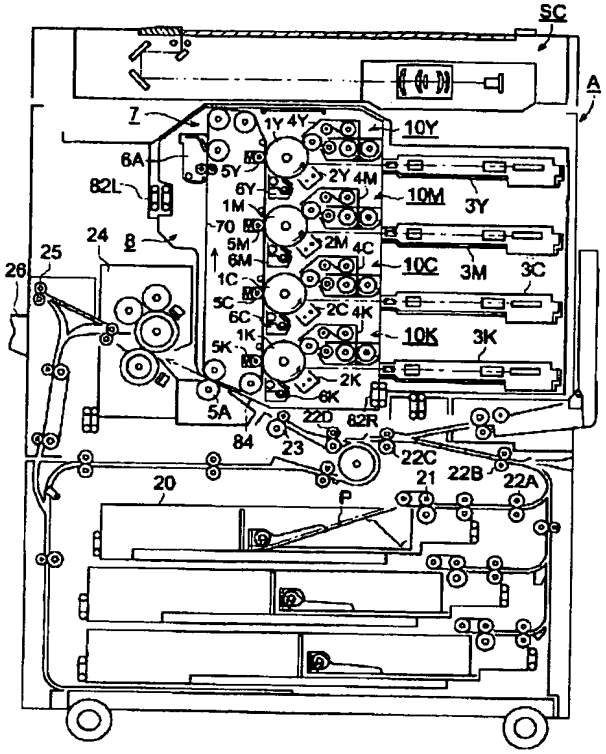
[Drawing 2]



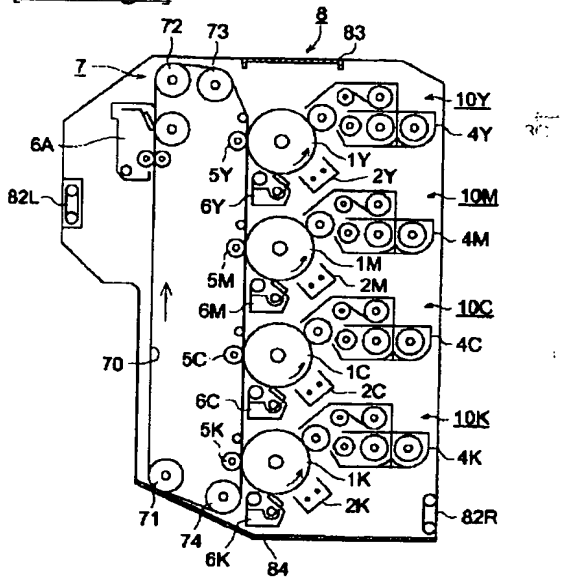
[Drawing 4]



[Drawing 1]



[Drawing 3]



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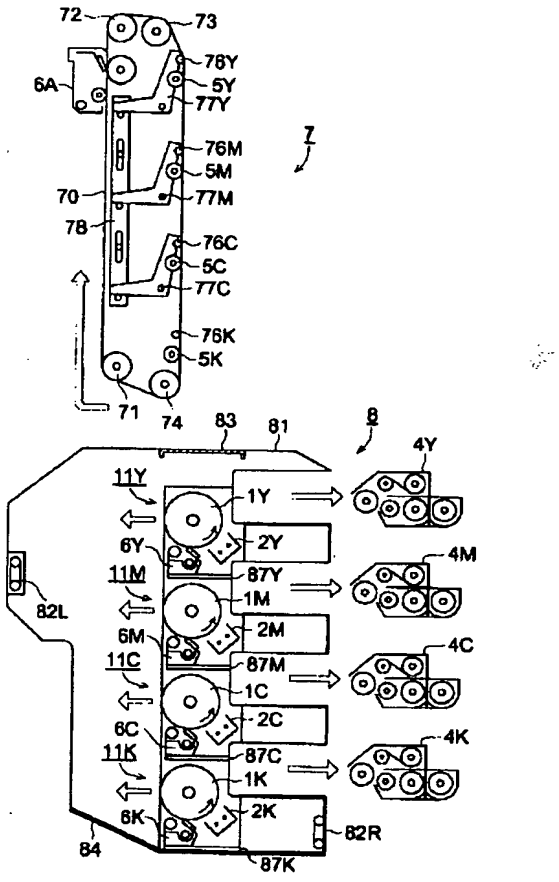
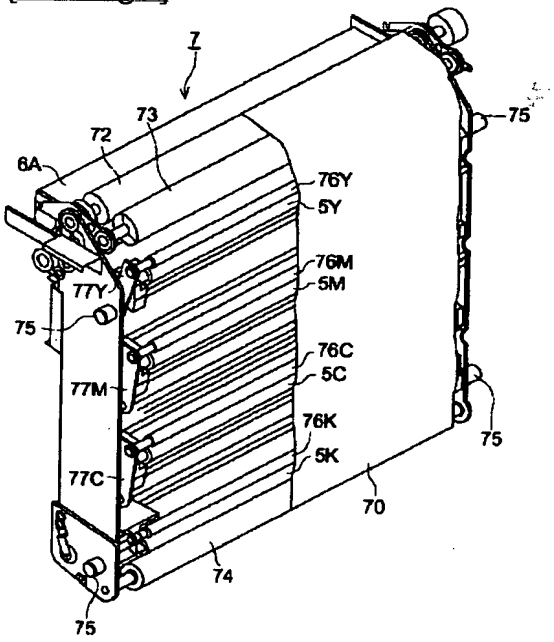


[Drawing 6]



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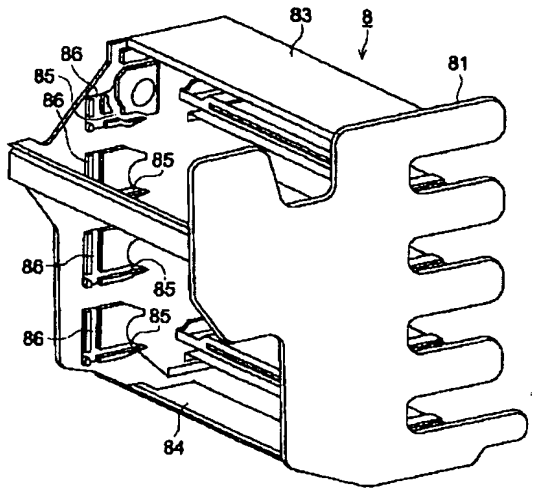

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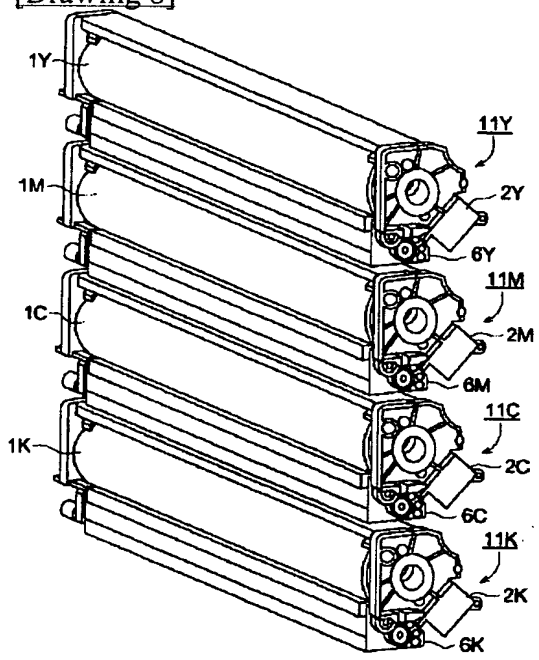

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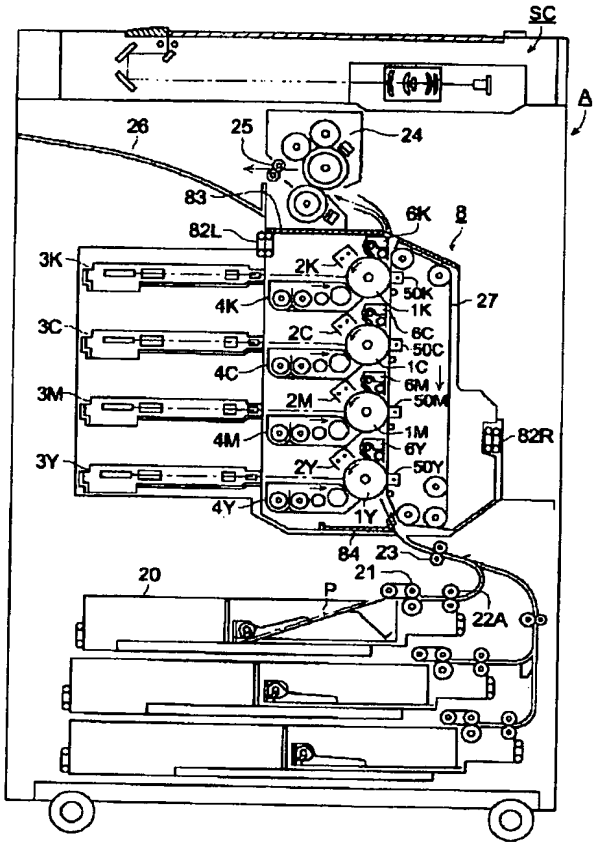
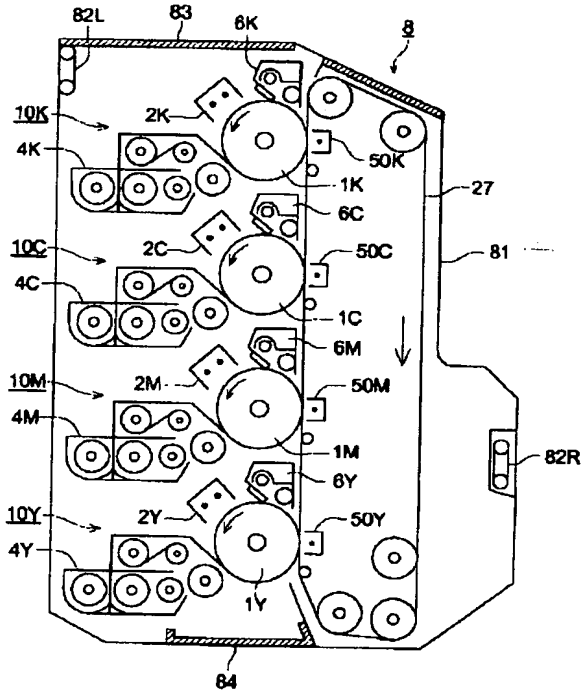


[Drawing 10]



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